

No.	Source Document	Section	Section Number	Page	Figure or Table Number	Comment Type (General or Specific)	Comment Subject	Comment
1	Gasco EE/CA	Interim Area Identification	4	70		Specific	Administrative Mechanism	First paragraph, last sentence. The final boundary for the GASCO sediment site will be defined in the Portland Harbor ROD. The text should be revised to note the final boundary will be defined in the Portland Harbor ROD.
2	Gasco EE/CA	Applicable or Relevant and Appropriate Requirements and To Be Considered Initiatives	3.5	65		General	ARARs	EPA's ability to waive ARARs is limited to specific instances such as the fund lead waiver or the technical impracticability waiver. The circumstances under which ARARs may be waived by EPA should be discussed.
3	Gasco EE/CA	Applicable or Relevant and Appropriate Requirements and To Be Considered Initiatives	3.5	66		Specific	ARARs	This paragraph identified below should be deleted as irrelevant, because the permit exemption is a different provision of CERCLA than the definition and analysis as to what are ARARs for a CERCLA remedy. The two requirements should not be mixed up or confused as being the same.  "Under CERCLA 121 (e), federal, state, or local permits need not be obtained for remedial actions which are conducted entirely on-site. "On-site" is defined as the "areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action" (40 CFR 300.5). Although a permit would not have to be obtained, the substantive (non-administrative) requirements of the permit must be met. Remedial activities performed off-site (such as a material sent off site for further management) would require applicable permits."
4	Gasco EE/CA	Applicable or Relevant and Appropriate Requirements and To Be Considered Initiatives	3.5	66		General	ARARs	Last sentence of second full paragraph on page - It should be noted that Appendix C of the Portland Harbor draft FS, which presents proposed numeric levels and methods of application for the ARARs, is still under review by EPA. Should this information in the Portland Harbor draft FS be modified, the Gasco EE/CA will need to be revised accordingly.
5	Gasco EE/CA	Chemical-specific Requirements	3.5.1	67		Specific	ARARs	First paragraph on page: It is recognized that this text was taken from the Portland Harbor draft FS. A similar comment is being provided through the Portland Harbor draft FS review process.  Although the OAR 340-041-0340 subsection is cited in the preliminary ARARs table, this subsection only contains the designated beneficial uses. This subsection does not contain the numeric criteria, which is how a "chemical-specific" ARAR generally is defined. The paragraph should be modified to include these references as shown below (modification shown in red text):  "Oregon's toxics numeric water quality criteria found at OAR 340-041-033 and Tables 40, 20, 33A and 33B have been identified as potential chemical-specific ARARs. In addition to Oregon WQS (OAR 340-041-0340), EPA has also identified federal NRWQC developed to protect ecological receptors and human consumers of fish and shellfish as potential relevant and appropriate requirements if they are more stringent than promulgated state water quality criteria. With respect to application of NRWQC, EPA directed the LWG to compare the NRWQC to the Oregon WQS. If there is no Oregon WQS and there is a NRWQC, comparisons should be made to the NRWQC. If the Oregon WQS have not been updated to reflect the most recent NRWQC or they are less stringent, then comparisons generally should be made to the NRWQC. More stringent state promulgated criteria will be applied over NRWQC. However, if the Oregon WQS is adopted after the most recent NRWQC, but is less stringent due to waterbody-specific reasons, EPA may determine that the NRWQC is not relevant and appropriate as long as the remedy will be protective using the Oregon promulgated standard (EPA 2010). Specific Oregon WQS and federal NRWQC and other chemical-specific ARAR numeric values are provided in Tables 1 through 5 of Appendix C of the Portland Harbor draft FS (Anchor QEA 2012a)."
6	Gasco EE/CA	Chemical-specific Requirements	3.5.1	68		Specific	ARARs	First paragraph on page: It is recognized that this text was taken from the Portland Harbor draft FS. A similar comment is being provided through the Portland Harbor draft FS review process.  Revise the paragraph as follows:  "EPA's target range for managing cancer risk is $1 \times 10^{-4}$ to $1 \times 10^{-6}$ , and the level for noncancer risk is an HQ of 1. While the target risk levels in the Oregon Rules for noncarcinogens and for the protection of ecological receptors are similar to those of the NCP, the Oregon Rules for individual and multiple carcinogens is more narrowly prescribed, are somewhat different than those under the NCP, which may be interpreted to be more stringent. are nevertheless protective."

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7	Gasco EE/CA	Action-Specific Requirements	3.5.3	68		General	ARARs	Second paragraph of section: Because Oregon's hot spot rules define a specific contaminant concentration or contaminant characteristics that if met require treatment or otherwise cleanup, it is more appropriately placed in the chemical-specific category, than action-specific. It is recognized that this same ARAR is identified in the Portland Harbor draft FS as an action-specific requirement and a similar comment is being provided on this issue through the Portland Harbor draft FS review process.
8	Gasco EE/CA	Action-Specific Requirements	3.5.3	68		General	ARARs	Reference to the new final rule on compensatory mitigation for losses of aquatic resources should be referenced as an ARAR in this section within the Section 404 discussion. This rule is available at <a href="http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/final_mitig_rule.pdf">http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/final_mitig_rule.pdf</a> .
9	Gasco EE/CA	Compliance with ARARs	7.2.3.1	190		General	ARARs	Regarding the FEMA floodrise requirement, the EE/CA "interprets the threshold as "less than 0.005 feet," based on the assumption that hydraulic model results less than 0.005 feet would be rounded to 0.00 feet and therefore meet the criterion." This seems inconsistent with the threshold used for the McCormick and Baxter cap project and in any case should be confirmed.
10	Gasco EE/CA	Compliance with ARARs	7.2.3.2	191		General	ARARs	The EE/CA Report states: All of the alternatives are expected to comply with the five primary ARARs evaluated in detail, with the possible exceptions of certain WQS/NRWQC and FEMA flood regulations. The implications of this statement should be discussed. For example, the placement of capping material may need to be offset through removal of material to allow attainment of the FEMA floodrise requirements.
11	Gasco EE/CA	FEMA Flood Rise Requirements	8.2.2.2.2	251		General	ARARs	NW Natural will need to consider the aggregate impacts of all harbor-wide capping activities when evaluating the FEMA flood rise requirement. This section should state this more clearly.
12	Gasco EE/CA	Indicator Chemicals (ICs)	2.5.1.2	25		Specific	COCs	The basis for the statement, "Generally, for upland data evaluations, PCBs and DDX are not reviewed because the Gasco and Siltronic properties have not been identified as sources of these chemicals" should be provided.
13	Gasco EE/CA	Appendix J				General	Cost Estimate	Paragraph 2, Purpose and Organization Section: The statement is made that U.S Environmental Protection Agency guidance (EPA 540-R-00-002) was followed in developing the cost estimates. In comparing the cost estimates to the EPA guidance document, the opinion of probable costs does not comply with this guidance manual or with any defensible professional estimate structure with backup documentation. There are numerous deficiencies in the presentation and details of Probable Cost Summary. Examples include: no use of element or sub-element details that show units of measure and unit costs; no provision of detailed cost back-up; no presentation to support a management level review; and no discussion of the time expected to achieve remedial action objectives and goals (which affects monitoring level of effort and cost). The estimate should be revised to comply with the EPA guidance document including, at a minimum, presentation of the quantity build-ups; units of measure and unit rates; summaries of the time periods over which the costs occur; back-up and supporting documentation for the costs; and expected times to achieve remediation goals.
14	Gasco EE/CA	Appendix J				General	Cost Estimate	Because there is no supporting data on unit rates, derivation of quantities, or presentation of execution details (such as the element and sub-element structures as described in the EPA guidance document for cost estimating) one cannot support the accuracy of the cost estimates nor the validity of the cost comparison between alternatives. The absence of supporting documentation does not allow an independent review and/or verification of relative costs. The reviewer is expected to accept the cost values on faith, not data. Please supply the data and cost back-up to support the evaluation.
15	Gasco EE/CA	Appendix J				General	Cost Estimate	The scope of work categories that are shown are too diverse and broad of scope to have been developed by valid parametric methods. For example, a cost is provided for Shoreline Excavation ranging from \$570,000 to about \$2.6 million without describing the nature of the work, productivity, the type of machinery, labor rates, or other relevant data from which one can evaluate the accuracy of the cost estimate. Please provide adequate detail of the type of operation occurring to allow evaluation of the cost by an independent reviewer.
16	Gasco EE/CA	Appendix J				General	Cost Estimate	There is no presentation of unit rates (these must be back-calculated from total cost and unit quantities), no indication of whether unit rates are inclusive or exclusive of overhead and profit, no indication of whether these rates are for material only or not, and no sources or back-up for the unit rates, such as vendor or supplier quotes. Please detail the costs that are included in the unit rates.
17	Gasco EE/CA	Appendix J				General	Cost Estimate	If, as cited in the text, data from past projects was used, there appears to be no application of adjustment of historical pricing to 2012 values. If past cost data was used, please clarify if costs were corrected to 2012 values.

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18	Gasco EE/CA	Appendix J				General	Cost Estimate	If data was used from different projects, there is no indication that any location normalization was applied to the different data sources to obtain a value representative of the proposed alternatives. Please clarify.
19	Gasco EE/CA	Appendix J				General	Cost Estimate	The capital costs are represented as occurring essentially in year 1 of the project, with no consideration of whether the alternatives require more than a year to implement. If the alternatives extend beyond 1 year, one would traditionally apply time-value-of-money factors and indicate those values in the calculations. Please indicate if the work occurs in the current cost year; if there are capital costs anticipated beyond the first year, please indicate as such and show any cost adjustments inclusive of the time-value-of-money or other corrections.
20	Gasco EE/CA	Appendix J				General	Cost Estimate	There is inconsistency between applied percentages for indirect costs between the text and cost tables. For example, the text states that construction management and daily oversight costs are estimated at 3%, whereas Table 1-3 uses 5%. Similarly, the text states Daily Agency Oversight and Project Management at 5%, while Table 1-3 uses 3%. Please correct as appropriate.
21	Gasco EE/CA	Appendix J				General	Cost Estimate	There is no presentation of the work elements that make up the long-term maintenance activities with associated costs. There is no indication of the time-value-of-money values used to calculate the net present worth. Please provide this information.  The use of percent factors in calculating indirect costs should be reviewed for reasonableness and adjusted accordingly. For example, a construction management cost of about \$9.8 million is applied to Alternative 5, low cost option. If one assumes a 2 year construction project (note there is no indication by the authors as to the duration), then this cost implies about 25 full-time equivalents of Construction Management support.
22	Gasco EE/CA	Appendix J			Table 1-3	Specific	Cost Estimate	There is a line item for Construction Management and Daily Oversight, and separate line item for Severson Construction Management and Project Management Team. These items appear duplicative. Please correct as necessary.
23	Gasco EE/CA	Appendix J			Table 1-3	General	Cost Estimate	Provide clarification that the mitigation cost line item amounts are sufficient to address damages anticipated from implementation of the various alternatives such as riverbank restoration. The amounts shown on Table 1-3 appear to be low.
24	Gasco EE/CA	Introduction	1		Figure 1.2.3-1	Specific	Data Presentation	The Site Location Map depicts the areas of chlorinated VOC detections off shore of the Siltronic property but does not present similar detections of aromatic VOC detections associated with discharge of contaminated groundwater associated with MGP operations at the GASCO site. The Site Location Map should be revised to include areas of aromatic VOC detections.
25	Gasco EE/CA	Adjacent Upland Properties	2.2.1		Figure 2.2.1-1	Specific	Data Presentation	The Site Layout Figure should depict the extent of the groundwater plumes at the GASCO Site and the adjacent Siltronic property.

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26	Gasco EE/CA	Development of Remedial Alternative Footprints	6.1			General	Development of Alternatives	<p>Although the EE/CA guidance recommends evaluating a limited number of alternatives, the range of alternatives evaluated only includes two removal action levels – 20 mg/kg and 1.5 mg/kg BaPEq. Consideration of additional action levels should be included. The alternatives should include a single removal emphasis and a single in-place technology emphasis alternative for each RAL. Although this action is being performed as a non-time critical removal action, because the removal decision is expected to be documented in the Portland Harbor ROD, the evaluation of an expanded set of alternatives is appropriate. It does not appear that the alternatives developed are consistent with the the risk management framework described in the Scope of Work (SOW) attached to the Administrative Order on Concent (AOC) for the Removal Action at the GASCO site which includes a preference for the removal of substantial product. In addition, RAO 1 specified in the SOW states that the objective for final remedial design is: Removal of sediments containing substantial amounts of product (e.g., solid “tar” and/or NAPL) that may serve as potential future source of risk material, unless it can be shown that the costs of such removal are clearly disproportionate to the degree of risk reduction to be attained through physical removal as compared to other remedial options for the same material.” The EE/CA must evaluate all removal options relative to RAO 1.</p> <p>Alternative 5 incorporates all of the most conservative cleanup options (e.g., large dredging footprint, rigid containment [only outside Navigation Channel], removal of all substantial product, and extensive riverbank excavation and capping), and consequently represents an appropriate “bookend” alternative to Alternative 1 (No Action). However, there is no gradation in the middle remedial alternatives that incorporate some of these elements. As a result the costs and duration of Alternative 5 far exceed other alternatives. The Draft EE/CA therefore inappropriately skews the comparative evaluation of alternatives. NW Natural needs to consider developing additional intermediate remedial alternatives at least consistent with the Portland Harbor draft FS.</p>
27	Gasco EE/CA	Development of Remedial Alternative Footprints	6.1			General	Development of Alternatives	Shallow dredging and capping under the dock structures should be evaluated as one of the alternatives to complete removal. For example, divers could dredge a 5-foot prism under the dock structures that would allow a thick cap to be placed under the docks.
28	Gasco EE/CA	Cleanup Materials	5.8.1	140		General	Disposal Options	First Paragraph: The following statement needs qualification - "Any of these in-water disposal options would be appropriate for Cleanup Materials if the facilities are available for use in time for the implementation of the Gasco Sediments Cleanup Action." However, use of these CDF and CAD facilities is contingent on the material meeting the respective acceptance criteria for each facility. For example, the Terminal 4 CDF will have acceptance criteria that prohibit disposal of hazardous waste or disposal of free oil. Contaminated sediments evaluated for removal at the GASCO site may exceed these standards.
29	Gasco EE/CA	Introduction	1	1		Specific	Editorial	First paragraph states that the AOC “contemplates”...AOC does not contemplate, but it spells out the performance to be expected in remediating contaminants at the site. Choose another word or revise sentence.
30	Gasco EE/CA	RAO Performance Goals and Measurements	3.4	58		Specific	Editorial	First paragraph under RAO3. Last sentence reads “...assuming a high consumption rate of 18 grams...”. The word “high” should be removed.
31	Gasco EE/CA	Riverbed Characteristics/ Dynamics and Sediment Transport	2.4.3.1	22		General	Editorial	<p>The Portland Harbor draft FS Report states: “The reaches between RM 5 and 7 and RM 10 and 11.8, where the river is relatively narrow, contain areas of small-scale net erosion interspersed with areas of net deposition.” The FS Report also states: “The model predicts that, over the long term, net erosion would be expected in the channel of RMs 5 to 7.” The stretch of the Willamette River between RM 5 and 7, is an area that includes a high percentage of non-cohesive sediments relative to the rest of the Portland Harbor site. The grain size distribution pattern between RM 5.5 and 6.5 is significantly different than the patterns elsewhere within Portland Harbor with a high percentage of coarse-grained, non-cohesive sediments present across much of this reach with the exception of a small band of finer-grained material along the GASCO shoreline (See Portland Harbor draft FS Report Figure 2.1-3). Similarly, the Portland Harbor draft FS Report Figure 2.1-4 demonstrates that across much of the reach between RM 5 and 7, the river is primarily erosional. In addition, the Sediment Transport Evaluation identified this reach of the river as in dynamic equilibrium. These points should be included in the discussion of sediment stability.</p> <p>This section also includes the following statement: “Further into the navigation channel exists a relatively high-energy sediment transport zone, as evidenced by time-series bathymetry and sand grain size in this area.” The lines of evidence for sediment stability presented in Figure 5.1.1.2-1 shows that much of the near shore area is category 1 (recovery is uncertain) or category 2 (recovery is somewhat less certain). Given significant concentrations of PAHs are present in surface sediments offshore of the Gasco site even though operations ceased in the 1950s demonstrates that although sediment deposition is occurring, reworking of the sediment bed continues to re-expose PAH contaminated sediments at the site. The text of this section needs to be revised accordingly.</p>

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32	Gasco EE/CA	MNR Conclusions	5.1.3	107		Specific	Editorial	Second to last sentence has the word "undergoing" twice. The paragraph discussing MNR processes in the Gasco SMA will need to be revised once further direction is provided by EPA on how MNR is evaluated after review of the Portland Harbor draft FS.
33	Gasco EE/CA	Compliance with ARARs	7.2.3.2	192		Specific	Editorial	The last sentence refers to "following actions..." but no actions are described. It appears there is some text missing.
34	Gasco EE/CA					General	Editorial	The entire document needs to be revised to remove the term "chemicals of concerns" and change it to "contaminants of concern" to be consistent with CERCLA and the NCP. The word "chemical," if used in relation to describing risk and/or what needs to be addressed through a cleanup action, should be revised to "contaminant." Chemicals are everywhere and not necessarily detrimental to the public or environment. Contaminants are chemicals at concentrations determined to have adverse affects on human health or the environment.
35	Gasco EE/CA	Title Page				Specific	Editorial	Report title should read Engineering Evaluation/Cost <b>Analysis</b> GASCO Sediments Cleanup Site.
36	Gasco EE/CA	Engineered Capping	5.4.2	115		General	ESA Consultation and Mitigation	The implementability discussion should consider the likelihood of endangered species act consultation on the cap design and placement. As demonstrated by the capping project at the Zidell site, the use of cobbles as an armoring layer may be required. The effectiveness of cobbles at preventing erosion at the GASCO site should be discussed.
37	Gasco EE/CA	Identification of Remedial Action Alternatives	6		Table 6.0-2	General	Evaluation of Alternatives	EE/CA Alternatives and RALs Comparison to Portland Harbor FS: The EE/CA provides Alternatives 1, 2a, 2b, 3, 4 and 5. EE/CA Table 6.0-2 compares the EE/CA and FS alternatives. Even though EE/CA Table 6.0-2 provides a comparison of "technologies options," the substantial differences discussed below are not shown on the table (only mentioned in a footnote). Of course by the nature of the specific evaluations, the EE/CA is more detailed; however, overall the EE/CA alternatives are substantially different than the FS alternatives and more discussion is needed concerning these differences.
38	Gasco EE/CA	Detailed Analysis of Alternatives	7			General	Evaluation of Alternatives	Reduction of Toxicity, Mobility or Volume through Treatment: The evaluations of this criteria are discussed for each alternative in Section 7 (e.g., Section 7.4.4 for Alternative 2a, 7.5.4 for Alternative 2b, 7.6.4 for Alternative 3, etc.). The text of these sections simply state how much active capping, how much stabilization with cement and how much dewatering is being performed. There is no discussion on how these actions affect toxicity, mobility or volume. These evaluations should be added.
39	Gasco EE/CA	Overall Protection of Human Health and the Environment	8.1	242		General	Evaluation of Alternatives	Third paragraph, third sentence. The statement "...the alternatives with more removal of sediment and riverbank soils results in unavoidable resuspension, release, and residuals that reduce the overall protection of human health and the environment provided by these alternatives..." Although resuspension cannot be completely avoided, the text must be revised to acknowledge that resuspension can be mitigated if proper containment is in place.
40	Gasco EE/CA	Protection of Upland Structures	6.4.3	165		General	Evaluation of Alternatives	The EE/CA states: "To support this significant bank reconfiguration, it is likely that Siltronic would need to temporarily shut down the facility, which may result in permanent loss of business and the likely termination of operations at the facility. Further, the Fab 1 building is constructed as slab on grade, such that significant structural damage resulting from undermining due to layback excavation is reasonably anticipated. Structural damage to Fab 1 will also result in permanent lost revenue and likely termination of operations at the facility. Similarly, it is anticipated that the foundation for the FMM tank may not support the extent of layback excavation proposed in Alternative 5." However, no geotechnical or economic analysis is provided to support these conclusions. It would seem that many of the effects described here could be mitigated. Furthermore, this demonstrates the need to look at additional RALs beyond the 1.5 mg/kg BaPEq used for Alternatives 4 and 5. There should also be further discussion of different technologies that do not create the same potential structural problems noted in this section. For example, removal could be truncated in the near shore area and the placement of surface caps placed within areas of shallow sediment and bank areas.
41	Gasco EE/CA	Alternative 1: No Action Detailed Analysis	7.3.1	207		General	Evaluation of Alternatives	The statement that the no action alternative "is projected to achieve long-term surface water concentrations post-remedy that are the same as all the other alternatives" is not substantiated nor accurate based on the CSM that shows existing product and contaminated sediment in the river is contributing to the surface water exceedances. Benzo(a)pyrene surface water samples collected in the vicinity of the Gasco site exceed water quality standards. As a result, it seems reasonable to assume that remedial efforts that remove and/or isolate PAH contamination will reduce surface water concentrations following remedy completion. This is documented in the modeling results which show that surface water concentrations for the no action alternative are higher than the other alternatives following removal action implementation.

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42	Gasco EE/CA	Alternative 2b Detailed Analysis	7.5.1	216		General	Evaluation of Alternatives	EPA does not agree that the no-action alternative will achieve RAOs and meet EPA's protectiveness standard. The level of risk reduction predicted by the fate and transport model at the Gasco site does not consider that elevated levels of contamination are still present in surface sediments off shore of the Gasco site despite the fact that those contaminants were released many decades ago. In addition, it is unclear whether Alternative 2a will achieve RAOs and meet EPA's protectiveness standard due to the reliance on MNR. Alternative 2b is the minimum alternative that may reasonably be expected to achieve EPA's threshold criteria. Alternative 2b consists of removal with a sand cover within the navigation channel with a mix of capping and removal with either a cap or sand cover in the nearshore areas. However, as presented in Table 6.0-2, Alternative 2b does not meet RAO 1 - preference for removal of substantial product.
43	Gasco EE/CA	Detailed Analysis of Alternatives	7?			General	Evaluation of Alternatives	Draft EE/CA SMAs assume that excavation of river sediment near the toe of slope requires 3:1 riverbank layback. Although the draft EE/CA notes the final design would likely result in a steeper bank slope, the draft EE/CA assumes a 3:1 slope for evaluating alternatives. This assumption results in excavation footprints that damage or destroy uplands groundwater SCMs and endanger the Siltronic building. Since remedies are evaluated and selected in the EE/CA, the assumption of a 3:1 slope in the draft EE/CA inappropriately and prematurely eliminates consideration of more aggressive sediment removal alternatives. Also, given the presence of Siltronic's building and that uplands SCMs will be realities on the ground during implementation of the in-water sediment remedy, temporary engineering measures designed to stabilize the slope and protect existing facilities that also allow for sediment excavation (e.g., mid-bank to top-of-bank sheetpile walls) should be considered.
44	Gasco EE/CA	Detailed Analysis of Alternatives	7?			General	Evaluation of Alternatives	<p>The comparative analysis of alternatives concludes that all alternatives are protective and meet sediment RAOs and that the only balancing factor that differentiates between alternatives is short-term effectiveness (i.e., the more sediment dredging the greater the detrimental impact to the environment). This is largely based on NW Natural's position that:</p> <ul style="list-style-type: none"> <li>• Rigid containment during dredging is ineffective and potentially harmful (national examples of problematic applications are discussed in detail, but not the successful local application with similar contaminants at Arco);</li> <li>• The fate and transport model predicts natural burial of contaminated sediments (however, empirical evidence indicates surface sediment concentrations are still relatively high despite decades of natural recovery);</li> <li>• Waiting 35+ years for MNR to achieve RAOs/RGs is acceptable (however, current benthic risks are unacceptable and waiting for this length of time may not be protective);</li> <li>• The upland HC&amp;C system provides an adequate long-term remedy for contaminated subsurface river sediment (however, this system has not been installed and evaluated for effectiveness, nor has the length of operation been established through the upland FS process); and</li> <li>• Remedial alternatives involving sediment and riverbank removal will compromise existing structures (e.g., Siltronic building) and/or destroy uplands SCMs (however, mitigation methods have not been evaluated to minimize impacts to the structures).</li> </ul> <p>As discussed above, making different assumptions and providing a more graduated range of alternatives would likely lead to different conclusions. In other words, it appears that the Draft EE/CA heavily weights remedial alternative evaluations to favor minimal remedial action. The Draft EE/CA appears to be less objective than it should be based on the information noted above.</p>
45	Gasco EE/CA	Oregon Environmental Cleanup Law	8.2.2.1	249		General	Evaluation of Alternatives	It is unclear how Alternative 2 demonstrates a higher cost threshold for removal. Alternative 2 does not remove or treat any material. NW Natural should provide the basis for the higher cost threshold.
46	Gasco EE/CA	EPA Guidance	9.1.1	266 - 271		General	Evaluation of Alternatives	The 17 principles identified in this section serve as excellent guidelines for making remedial action decisions at contaminated sediment sites. However, the degree to which the underlying analysis supports the statements varies. For example, the short-term effects noted in Item 14 may be mitigated through various BMPs and the CSM refinement discussed in Item 4 should acknowledge the uncertainty in understanding long-term contaminant reductions through MNR.
47	Gasco EE/CA	Sediment Quality	2.5.2	27		Specific	Fate and Transport Model/MNR	Last Paragraph: The sediment trap data indicate that sediment moving downstream from the Gasco site is more than an order of magnitude higher in BaP than sediment coming into the site (300-1,000 µg/kg out versus 20-50 µg/kg in). This indicates that sediment at Gasco is an ongoing source to the river and requires action. It does not support MNR as suggested later in the report. This is also inconsistent with the contention that Gasco is primarily a depositional area as suggested by the lines of evidence in Figure 5.1.1.2-1 panels 2 and 6.
48	Gasco EE/CA	Monitored Natural Recovery	7.2.4.2.1	195		Specific	Fate and Transport Model/MNR	The last two sentences, beginning with: "During such an extreme flood event..." describe erosion, downstream transport, and a return to pre-flood equilibrium. Essentially, some of the contamination is getting washed downstream and is replaced by other sediment from upstream areas that has lower concentrations of Gasco COCs. This is not an appropriate MNR process as it recontaminates areas downstream.

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49	Gasco EE/CA	Alternative 1: No Action Detailed Analysis	7.3.1	207		General	Fate and Transport Model/MNR	The EE/CA Report states that the No Action alternative "is expected to meet sediment RAOs 2, 3, 6, and 7." This determination is based solely on the results of the contaminant fate and transport model and is subject to a high level of uncertainty. The uncertainty of this outcome should be discussed in this section.
50	Gasco EE/CA	Alternative 2a Detailed Analysis	7.4.1	211		General	Fate and Transport Model/MNR	Alternative 2b relies on MNR to achieve remedial action objectives adjacent to and within the navigation channel. This is an area that is subject to propwash, maintenance dredging, is dominated by coarse grained materials (demonstrating a lack of deposition) and has higher surface than subsurface sediment concentrations. These empirical lines of evidence are far more reliable than the results of the fate and transport modeling effort that is being used to demonstrate that Alternative 2b is expected to meet RAOs. This alternative is unlikely to meet the threshold criteria of protectiveness and meeting ARARs, including the Oregon Environmental Cleanup Law. Additional justification should be provided for the effectiveness of MNR in this alternative given these conditions.
51	Gasco EE/CA	Alternative 2a Detailed Analysis	7.4.3	213		General	Fate and Transport Model/MNR	Minimization of Potential Long-term Sediment Recontamination - This section states that upstream concentrations will cause contaminant concentrations to rise following capping of the nearshore area. This does not seem to take into account the reliance on MNR in off shore areas. Empirical evidence suggests that MNR is not likely to occur at this location given the elevated levels of PAH contamination in surface sediments offshore of Gasco despite the fact that the release occurred many decades ago. In addition, sediment concentrations in this area are higher than background levels. Thus the statement that contaminant concentrations will rise but still be protective should be justified more clearly.
52	Gasco EE/CA	Surface Sediment RAOs	8.1.1	243		General	Fate and Transport Model/MNR	The EE/CA report states that "a combination of active remedies and MNR would result in substantially reduced long-term sediment concentrations, as indicated by the fate and transport modeling projections previously summarized." Empirical evidence suggests that MNR may be of limited effectiveness in at least some areas within the Gasco removal action area. There is an over reliance on the fate and transport modeling results over empirical data and the EE/CA fails to acknowledge the uncertainty in the modeling results.
53	Gasco EE/CA	Surface Sediment RAOs	8.1.1	243		General	Fate and Transport Model/MNR	The EE/CA Report states: "...empirical data on sedimentation rates, upstream sediment loads, bathymetry, and sediment core profiles reviewed in Section 5.1 indicate deposition of low contaminant concentration sediments (i.e., in the range of background for PAHs) from upstream, particularly in areas with elevated COC concentrations over the long term. This supports the conclusion that a combination of active remedies and MNR would result in substantially reduced long-term sediment concentrations, as indicated by the modeling projections previously summarized." While it is true that the empirical data suggest that MNR may be effective in limited areas, the elevated levels of PAH contamination in surface sediments offshore of Gasco despite the fact that the release occurred many decades ago suggests that MNR will not be effective. In addition, areas adjacent to and within the navigation channel are even less likely to be amendable to MNR due to the presence of coarse grain sediments, anthropogenic effects such as propwash and dredging and the presence of surface sediments at higher concentrations than subsurface sediments.
54	Gasco EE/CA	EPA Guidance	9.1.1	268		Specific	Fate and Transport Model/MNR	Item 6. Third sentence. The majority of Gasco sediments have not recovered naturally over the years, as this site continues to demonstrate unacceptable risks to human health and ecological receptors.
55	Gasco EE/CA	Other Short Term Impacts	8.5.4	260		General	Green Remediation	While this section discusses ways to mitigate air pollution impacts, a broader discussion of meeting EPA Region 10's Clean and Green requirements should be added to the EE/CA. For example, when discussing active removal of substantial product, the evaluation should not stop at the activities having negative air impacts. Mitigation efforts should be discussed and costed at an EE/CA level of accuracy.  EPA's Clean and Green Policy and Region 10 requirements are located at <a href="http://yosemite.epa.gov/R10/extaff.nsf/programs/greencleanups">http://yosemite.epa.gov/R10/extaff.nsf/programs/greencleanups</a> . Green remediation technologies and practices should be considered for all work activities. A comprehensive set of greener approaches to site cleanup may be found at <a href="http://www.clu-in.org/greenremediation">http://www.clu-in.org/greenremediation</a> .
56	Gasco EE/CA	Dredge Material Transport and Disposal	5.8	142		General	Health & Safety	This section does not include a discussion of worker protection that may be necessitated by higher levels of contaminants present in some dredged material. Worker safety considerations need to be reflected in this discussion on landfill selection for both Special and Hazardous Wastes.
57	Gasco EE/CA	Sub-sediment Management Area Development	4.5	92		General	Incorporation of Site-Specific Data	The physical features presented in this section should be expanded to include areas of erosion/deposition, debris areas, areas targeted for future redevelopment, habitat areas, slope, presence of underwater utilities, presence of bedrock outcrops within the sediment bed, hot spots and areas with principle threat material (e.g., NAPL), areas with active upland sources or where source control is required to prevent recontamination.

No.	Source Document	Section	Section Number	Page	Figure or Table Number	Comment Type (General or Specific)	Comment Subject	Comment
58	Gasco EE/CA	Buried Contamination Analysis	4.6	95		General	Nature and Extent of Contamination	Last sentence of first paragraph: This sentence states that, "...other factors such as river currents, propwash, and wave action on shoreline areas were not found likely to cause exposures of buried contamination." However, empirical evidence from the Gasco site (i.e., that it is dominated by coarse grained materials, higher surface sediment concentrations than subsurface concentrations, etc.) demonstrate a lack of deposition or re-working of sediment within some areas of the Gasco Sediments Site. Further, the U.S. Army Corps of Engineers has estimated up to 4 feet of scour may occur below the bottom of their vessels. The buried contamination analysis should take into account scouring that may occur below the new surface material exposed after maintenance dredging has been completed.
59	Gasco EE/CA	Sediment Quality	2.5.2	27		General	Nature and Extent of Contamination	The EE/CA describes BaP sediment trap concentrations immediately downstream of the Gasco site in the 300 – 1,000 ug/kg range while concentrations immediately upstream are in the 20 – 50 ug/kg range. This section should note that while the downstream concentrations are below the RALs selected for evaluation in the Portland Harbor FS, they exceed the direct contact PRG of 423 ug/kg and demonstrate that the Gasco site continues to be a source of downstream PAH contamination.
60	Gasco EE/CA	Sediment Quality	2.5.2	26-27		General	Nature and Extent of Contamination	The discussion of the nature and extent of sediment contamination should include a discussion of naphthalene. Naphthalene is the most soluble of the PAH compounds and is present at much higher levels at the Gasco site than more volatile compounds such as benzene, toluene, ethylbenzene, and xylenes (BTEX). When assessing contaminant migration, understanding the potential for naphthalene discharges is important.
61	Gasco EE/CA	Riverbank Soils Quality	2.5.7	35		General	Nature and Extent of Contamination	The text needs to be revised to note that areas of blue soil staining, indicative of cyanide contamination, have been detected in riverbank soils at the Gasco site.
62	Gasco EE/CA	Dredge Elutriate Testing	2.6.2	37 - 38		General	Nature and Extent of Contamination	This section should include a discussion of the water quality sampling that was performed during the 2005 removal action at the Gasco site. Water quality monitoring downstream of the Gasco removal action detected numerous exceedances of both the acute and chronic water quality criteria for PAHs such as benzo(a)pyrene, benzo(a)anthracene and naphthalene. Although the 2005 removal action targeted the tar body, and thus would be expected to generate higher concentrations of dissolved constituents, the information may be useful in the assessment of short term impacts during dredging activities.
63	Gasco EE/CA	Screening of Gasco Site Data with Portland Harbor Site-Specific PRGs	2.7.2	42		General	Nature and Extent of Contamination	The second paragraph of this section starting with, "It should be noted that risk management recommendations for all the contaminants posing potentially unacceptable risks..." should be deleted. The risk management recommendations submitted by LWG for the Portland Harbor site are still under review and EPA will be preparing its own set of risk management recommendations. Given that the Gasco EE/CA will be supplementing the Portland Harbor FS, how risk management is applied for the Portland Harbor site remedy is more appropriately discussed in a site-wide context in the Portland Harbor FS, not in this EE/CA.
64	Gasco EE/CA	Screening of Gasco Site Data with Portland Harbor Site-Specific PRGs	2.7.2	42 - 43		General	Nature and Extent of Contamination	Somewhere in this section there should be explicit recognition that the levels of contamination offshore of the Gasco site are well above screening criteria and PRGs established at the Portland Harbor site for the purposes of the FS. A table that presents the concentrations in all media compared to PRGs is necessary.
65	Gasco EE/CA	Substantial Presence of Product	4.1.1	72		Specific	Nature and Extent of Contamination	EPA's November 28, 2011 comments on the October 19, 2011 Technical Briefing requested a discussion of the removal and capping of the tar body in 2005. While the 2005 removal action is discussed in Sections 2.2.4 and 4.1.1, a figure delineating the areas of remaining tar below and downriver of the FAMM dock was not provided as requested in Technical Briefing General Comment #4.
66	Gasco EE/CA	Introduction	1		Figure 1.2.4-1	Specific	Project Schedule	The Project Schedule should be updated to reflect the latest understanding of the Portland Harbor Proposed Plan and ROD development schedule.
67	Gasco EE/CA	Portland Harbor Draft FS RAOs	3.2	49		Specific	RAOs, RGs and RALs	Last Paragraph of RAO 2 section paraphrases text from Section 3.2.1 of the Portland Harbor draft FS. The text should be modified as shown below (modifications shown in red text). A similar comment regarding this text was submitted as a result of the Portland Harbor draft FS review.  "Because of upstream loads of several contaminants, Portland Harbor Site sediment remedies by themselves will not result in the achievement of surface water concentrations at the Portland Harbor Site below all potential surface water ARARs related to fish consumption. <b>Upland source control actions within the Portland Harbor Site and upstream source control will reduce loads to achieve human health water quality standards for fish consumption.</b> Other contaminant reduction efforts conducted under other regulations and programs within the <b>Portland Harbor site and larger</b> Willamette River watershed <b>too will be</b> necessary to achieve these surface water criteria."

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68	Gasco EE/CA	Portland Harbor Draft FS RAOs	3.2	49		Specific	RAOs, RGs and RALs	<p>RAO 3 - It should be noted that the text being referenced by this comment was taken directly from the Portland Harbor draft FS. A similar comment regarding this text was submitted as a result of the Portland Harbor draft FS review. NW Natural should review the Portland Harbor draft FS text after revisions have been made in response to EPA comments to ensure consistency. This is true for other sections of the Gasco EE/CA that rely on text taken directly from the Portland Harbor draft FS.</p> <p>Carcinogenic PAHs exceed the <math>10^{-6}</math> risk level based on a drinking water exposure scenario. In addition, although depth integrated surface water samples do not exceed MCLs, some near bottom samples do exceed MCLs for chemicals such as vinyl chloride and BaP. The Gasco EE/CA, by way of copying the Portland Harbor draft FS text, indicates that RAO 3 is already being achieved. This is not necessarily accurate. It should be acknowledged that there may be a potential impact on the drinking water beneficial use of the Willamette River and note that upland and watershed wide source control efforts will be required to reduce contaminants associated with the drinking water exposure pathway.</p>
69	Gasco EE/CA	Portland Harbor Draft FS RAOs	3.2	49		Specific	RAOs, RGs and RALs	<p>Section on RAO 3, first paragraph - It should be noted that the text being referenced by this comment was taken directly from the Portland Harbor draft FS. A similar comment regarding this text is being submitted as a result of the Portland Harbor draft FS review. NW Natural should review the Portland Harbor draft FS text after revisions have been made in response to EPA comments to ensure consistency.</p> <p>The text indicates that potential localized cancer risks exceeding <math>1 \times 10^{-4}</math> were identified in the BHHRA. The text should clarify what these potential localized cancer risks are (for example, a recreational user or subsistence, the contaminant, etc.). The second part of this sentence starting with "...based on the weight of evidence, potentially unacceptable risk from existing and likely future surface water exposures at the Site were not identified in the LWG's risk management recommendations" should be deleted. The paragraph continues by stating that "...none of the surface water samples exceed drinking water standards. Therefore, remedial alternatives do not need to be evaluated relative to this RAO, because the RAO is already being achieved." However, while depth integrated surface water samples do not exceed MCLs, some near bottom samples do exceed MCLs for contaminants such as vinyl chloride and BaP.</p>
70	Gasco EE/CA	Portland Harbor Draft FS RAOs	3.2	50		Specific	RAOs, RGs and RALs	<p>Section on RAO 3, last paragraph, footnote 2 - It should be noted that the footnote being referenced by this comment was taken directly from the Portland Harbor draft FS. A similar comment regarding this text is being submitted as a result of the Portland Harbor draft FS review.</p> <p>Footnote 2 should be deleted because it is not an accurate statement. The beneficial use standard does not state it "presumes" pre-treatment. Furthermore, the numeric criteria that the lower Willamette River must meet, which EPA approved, for protecting beneficial use of domestic or private water supply are in fact for a majority of pollutants equal to or lower in concentration than MCLs. Thus, there is no basis in language or fact to support the LWG's interpretation of the Oregon water quality standards.</p>
71	Gasco EE/CA	Refined Remedial Action Objectives	3.3	55 - 56		General	RAOs, RGs and RALs	The surface water RAOs focus on fluxes from contaminated sediments within the project area. The text should be revised and expanded to include groundwater fluxes.
72	Gasco EE/CA	RAO Performance Goals and Measurements	3.4	57		General	RAOs, RGs and RALs	The performance goals focus exclusively on BaP. While this may be the driver, there are other contaminants in the area that, while they did not originate from the Gasco site (e.g., PCBs, DDx and TCE) are commingled with contamination from the Gasco site and which may require evaluation to ensure protectiveness.
73	Gasco EE/CA	Chemicals of Interest	2.5.1.1	24		General	RAOs, RGs and RALs	DEQ considers the list of COI included in Section 2.5.1.1 (see page 24) to be incomplete without "gasoline range hydrocarbons." It is unclear why this constituent was not included in the SOW and carried forward in the Draft EE/CA, as some of the highest concentrations in Portland Harbor are detected in sediments offshore of the Gasco site. Based on this information, DEQ considers gasoline range hydrocarbons to be an important site-specific COI. Furthermore, given gasoline range hydrocarbons are present above baseline ecological screening levels in offshore sediment, the Draft EE/CA should consider concentrations of this constituent to be a COPC in water and sediment for the project. EPA does not believe the petroleum exclusion applies to any releases from the Gasco oil gasification process. If NW Natural has any case supporting that such releases are, please forward them to EPA.
74	Gasco EE/CA	Screening of Gasco Site Data with PH Site-Specific PRGs	2.7.2	43		General	RAOs, RGs and RALs	Section 2.7.2 (see page 43) of the Draft EE/CA does not evaluate RG levels below background or less than 0. Risk-based goals that are below background should highlight the importance of background as a remedial goal.

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75	Gasco EE/CA	Overall Protection of Human Health and the Environment	7.2.2.1	182		General	RAOs, RGs and RALs	Although fish tissue is used to evaluate risks associated with human fish consumption, fish consumption AWQC for benzo(a)pyrene are exceeded offshore of Gasco and elsewhere within Portland Harbor. Under CERCLA, achieving ARARs is a threshold criteria that must be met. Although there are other sources of carcinogenic PAHs that may be impairing the surface water, Gasco's releases are a known source of PAH surface water contamination and the EE/CA needs to evaluate alternatives that control the Gasco sources to meet AWQC, i.e., the sediment and dissolved contaminants from sediment, and groundwater flux.
76	Gasco EE/CA	Appendix B				General	Remedial Design	Although no archaeological deposits were observed during the removal of the "tar body," the Tribes are supportive of using an archaeologist to monitor removal actions for the Gasco sediments cleanup site. Additionally, we recommend that NW Natural consider developing an Inadvertent Discovery Plan for Alternatives 2a, 2b, 3, 4, and 5 that would be followed should cultural material be encountered.
77	Gasco EE/CA	Adequacy of Controls	8.3.6	255		General	Residuals Management	The adequacy of controls evaluation should take into account the long-term effectiveness of the sand cover to be placed following removal for Alternatives 2b, 3, 4, and 5.
78	Gasco EE/CA					General	Risk Evaluation	Lines of evidence and hazard quotients greater than 1 from the BERA appear to be missing from the Draft EE/CA presentation and analysis. For example, surface water lines of evidence were inappropriately dropped through the management recommendations in the Portland Harbor draft FS and therefore were not included in the Draft EE/CA. This also applies to transition zone water.
79	Gasco EE/CA	Appendix G				General	Risk Evaluation	The agencies are still reviewing Appendix G - Project AIR Data Rescreen given the large amount of information provided in this section of the EE/CA (over 1,100 pages) and will be providing comments under a separate cover, as needed, at a later date. Appendix G represents work that was postponed in June 2010 to facilitate in-water data gaps sampling field work and in recognition that screening criteria for the in-water BLRA and uplands RA were still under development. Appendix G should screen available data for the complete list of analytes using the most current agreed-upon in-water and uplands risk-based screening criteria. The primary objective of the analysis is to evaluate the risk associated with sediment contamination and support NW Natural's evaluation and selection of sediment remedial alternatives. In addition, this appendix is supposed to fully address EPA's May 4, 2010 comments on the Draft AIR and Data Gaps QAPP with regard to analyte lists, lines of evidence, and screening criteria.  Additional time is needed to sufficiently review this appendix to determine whether the above objectives have been met and whether screening has been completed consistent with commitments made by NW Natural.
80	Gasco EE/CA	Dredging/Removal	7.2.4.2.3	197		General	Risk Reduction vs. Mass Removal	The EE/CA report states: "mass removal is not a goal supported by the sediments guidance." While it is true that mass removal alone should not be the focus, NW Natural should realize that mass removal, as it relates to long-term risk reduction, may be relevant. For example, it may be possible, through mass removal, to have greater confidence in long term effectiveness. And if some mass constitutes a hot spot under Oregon rules or PTM, such mass may have to be removed due to toxicity, mobility, or problems with reliable containment.
81	Gasco EE/CA	Regulatory Oversight of Riverbank Remedy	1.2.4.3	7		General	Riverbank Delineation	The last sentence of this section indicates, "Consistent with this approach, the alternatives evaluated in this EE/CA include remediation and source controls for <u>soils</u> on the sloping portions of the riverbank." Section 3.4.1.3 of the SOW indicates that the need for riverbank work shall be determined by the need to control sources of contaminants from the riverbank to the river including "b. leaching of chemicals due to shallow groundwater movement through the bank" and "c. and/or stormwater infiltration and discharge through riverbank soils." Inclusion of groundwater and stormwater should be added to this section.
82	Gasco EE/CA	RAO 2	3	48		Specific	Site-Wide Evaluation vs. Relevant Exposure Areas	This section describes calculating surface area weighted average concentrations (SWACs) for shoreline ½ River Miles (RM). It would be preferable to average over the Gasco area of interest to reduce inclusion of areas that are not associated with the site.
83	Gasco EE/CA	Site Uses Sub-SMA Designation	4.5.1	92		General	SMAs	The area should not be "parcelized" to small sub-areas that it would be impossible to implement a remedy or remedies.

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84	Gasco EE/CA	Source Control Activities and Status	2.3			General	Source Control	Consistent with DEQ's September 22, 2011 letter commenting on the Revised Interim Design Report , the remedial action objectives (RAOs) for groundwater source control are to prevent migration of contaminated groundwater from the uplands to the Willamette River in a manner that minimizes DNAPL mobilization resulting from groundwater source control measures (SCMs) along the portion of the shoreline where DNAPLs occurs. Preventing contaminated groundwater from migrating to the river involves controlling and containing groundwater in the Fill water-bearing zone (WBZ) and the Alluvium WBZ. To control and contain groundwater in the Fill WBZ, DEQ accepted NW Natural's approach of using a fully-penetrating interceptor trench. The Alluvium WBZ SCM is a well-based hydraulic control and containment (HC&C) system designed to reverse hydraulic gradients from the river towards the uplands. Source control discussions presented in the Draft EE/CA (e.g., see Section 2.3.1.1) emphasize the status of the Alluvium WBZ HC&C system. However, source control will not have been achieved without preventing groundwater from both the Fill WBZ and the Alluvium WBZ from migrating to the river. NW Natural proposes to construct the interceptor trench concurrently with the riverbank cleanup included in the in-water sediment remedy. This proposal, including NW Natural's rationale, was previously presented in the Revised Interim Design Report. DEQ did not approve NW Natural's proposal, determining that postponing trench construction until sometime after the in-water project is initiated will significantly delay source control of the Fill WBZ. DEQ communicated its disagreement with NW Natural's proposal and DEQ's comments on the length, alignment, and sequence and schedule for construction of the interceptor trench in letters dated September 22, 2011 and December 7, 2011, which should be referred to for additional information.
85	Gasco EE/CA	Source Control Activities and Status	2.3			General	Source Control	<p>NW Natural is developing a groundwater model to evaluate the performance and operation of the groundwater source control measures (SCMs). According to Section 2.3.1.1, the groundwater model and currently available data are used to predict the offshore extent of seepage control that will be achieved by the HC&amp;C system subsequent to implementation. In addition, the groundwater model is used in conjunction with a sediment cap fate and transport model to assess the isolation cap effectiveness in Section 5.4. NW Natural indicates in Section 2.3.1.1 that the model predicts the HC&amp;C system will reverse the groundwater gradients in the Alluvium WBZ over an area encompassing approximately 1,800 feet of shoreline and extending about 700 feet out and under the Willamette River. NW Natural further indicates that within this area: 1) seepage of groundwater from the Alluvium WBZ into the river will be prevented; and 2) concentrations of COI in sediment will decrease over time as surface water migrates from the river into the sediments. In general, EPA and DEQ disagree with these assertions and find them to be unsupported for the following reasons:</p> <ul style="list-style-type: none"> <li>• There is no documentation provided in the Draft EE/CA regarding the model used to generate Figure 2.3.1.1-1. Although NW Natural indicates the model uses conservative assumptions, information about the model set-up, input parameters, and the site conditions to which the model is calibrated are not provided. Furthermore, the model output upon which Figure 2.3.1.1-1 is based is not included in the Draft EE/CA.</li> <li>• The uplands groundwater model referenced in the Draft EE/CA is currently undergoing development. According to NW Natural, the model will not be suitable for predictive purposes until the full-scale HC&amp;C system is constructed and tested late in 2012, and that data is incorporated into the model in 2013. Consequently, the descriptions of model predictions presented in the Draft EE/CA should be considered preliminary and subject to change in the future.</li> <li>• NW Natural's assertion that COI concentrations in sediment will decline over time appears to presume that contaminated sediments are absent. As indicated in Section 8.3.6 (Adequacy of Controls), all of the remedial alternatives evaluated in the Draft EE/CA will leave residual contamination. Given the magnitude and distribution of contaminated sediment in the Gasco Sediment Project area, concentration trends of COI in sediment will ultimately be more dependent on, and controlled by the remaining residual sediment contamination. In other words, desorption of COI into the dissolved phase will have a negligible effect on concentrations in sediment and mass reduction overall, especially in areas where sediment is impacted by left-in-place MGP waste.</li> </ul>
86	Gasco EE/CA	Source Control Activities and Status	2.3			General	Source Control	For purposes of identifying remedial alternatives (Section 6), conducting detailed analyses of remedial alternatives (Section 7), and completing comparative analyses of alternatives (Section 8), the Draft EE/CA appears to presume the HC&C system will be a long-term fixture in the uplands that maintains the model-predicted hydraulic gradients from the river towards the uplands illustrated in Figure 2.3.1.1-1 for at least 100 years. However, the HC&C system is not identified in the Draft EE/CA as an element of the in-water remedy. In addition, the uplands feasibility study (FS) has not been initiated. Consequently, the HC&C system has not been subject to detailed analysis against uplands FS remedy selection factors. Including the presence, operation, and influence of the HC&C as a baseline condition leads to overly favorable predictions regarding the long-term effectiveness of in-water remedial alternatives. Based on this information, it is not appropriate to rely on the HC&C to address subsurface contaminated sediment. That said, an active cap could be an effective approach to manage flux of contaminated groundwater to the river (contaminated from subsurface river sediment or otherwise). The Draft EE/CA should discuss the HC&C system in terms of being a common element of each of the in-water remedial alternatives, and fully explain how the presence or absence of the HC&C system influences predictions of the performance and effectiveness of alternatives.
87	Gasco EE/CA	Source Control Activities and Status	2.3			General	Source Control	Performance of upland source control, flux, and mobility of contaminants should continue to be evaluated post-ROD with actual field data. These data may impact the level of reliance on a capping alternative and/or impact cap design. Also, even if source control efforts are fully successful, diffusion of substantial product constituents will require evaluation based on actual field data.

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88	Gasco EE/CA	Source Control Activities and Status	2.3			Specific	Source Control	The success of any remedy at the Gasco sediments cleanup site depends in large part on the success of source control at the Gasco and Siltronic properties. The predictions of flow reversal from the groundwater model should be validated before the sediment remedy is finalized.
89	Gasco EE/CA	RAO Performance Goals and Measurements	3.4	61		General	Source Control	The EE/CA indicates that implementation of the “upland groundwater extraction system will result in a reversed groundwater gradient in the alluvial sediments” (page 61, paragraph 2). The extent of offshore groundwater capture and seepage rates are shown in Figure 2.3.1.1-1. The area of reverse flow (i.e., river to groundwater) is extensive and extends over 1,800 ft along the shoreline and 700 feet into the river. A groundwater model was used to design the groundwater extraction system (CDR, Anchor QBEA 2012b).  The model extent is used to support selection of alternatives particularly related to capping in areas of substantial product (i.e., the EE/CA states that this is appropriate because flow will not be from the sediment into the river). The area of reserved flow seems very large and the modeling results should be evaluated in more detail. This detailed evaluation should present the uncertainties associated with the groundwater model and the implications associated with this uncertainty. Implications may result in a smaller area of flow reversal than shown on Figure 2.3.1.1-1 as controlled by the yet to be completed and fully tested hydraulic containment and control system.
90	Gasco EE/CA	Buried Contamination Analysis	4.6	95		General	Source Control	The EE/CA states that modeling of subsurface transport due to groundwater flow “was not conducted for the Gasco Sediments Site because an underlying assumption for all EE/CA alternatives, including the no action alternative, is that source controls will be in full operation at the time of construction.” Further analysis should be provided that demonstrates the degree to which groundwater source control measures will limit or minimize groundwater flow to the Willamette River such that this important transport pathway does not need to be considered.
91	Gasco EE/CA	Detailed Analysis of Alternatives	7			General	Source Control	The Draft EE/CA indicates that Alternative 3 excludes observations of liquid substantial product which do not occur within 0 to 3-feet below mudline because deeper occurrence was assumed to have limited potential for migration to the overlying surface sediments. Note that physical migration of the product is not the only scenario that needs to be evaluated in the Draft EE/CA. For example, both liquid and non-liquid product below a depth of 3-feet is a source for dissolved phase contaminant migration which can recontaminate cover material, impact sediment pore water, and load the cap. The Draft EE/CA needs to evaluate this contaminant migration and exposure pathway independent of the predictions made regarding the long-term influence of the HC&C system on hydraulic gradients between the uplands and river.
92	Gasco EE/CA	Gasco Source Control Activities and Status	2.3.1	16		General	Source Control	It should be noted that effective groundwater source control is a prerequisite for an effective in-water remedy due to the potential for DNAPL migration to the Willamette River and the elevated levels of dissolved contaminants present in groundwater at the Gasco site. This is particularly true for remedies that involve the use of in-place controls such as capping and in-situ treatment. Accordingly, their needs to be a presentation on the current uncertainty associated with the groundwater model and the implications of this uncertainty on the predicted success and effectiveness of the source control as well as how this uncertainty effects the in-water remedy alternatives evaluation.
93	Gasco EE/CA	Groundwater Source Controls	2.3.1.1	16	Figure 2.3.1.1-1	Specific	Source Control	The text and figure describe and show a light green hatched area where “the groundwater gradient is reversed, thereby preventing seepage of groundwater into the Willamette River.” This area extends approximately 750 feet into the river. It seems unlikely that flow reversal can be achieved to this distance. This extent is based on the results of a preliminary model but the full-scale system is being developed and will be used to calibrate and verify the groundwater (MODFLOW) model. Currently, it does not appear that NW Natural has sufficiently supported the contention that there will be such a large capture zone for the extraction system. The modeling results should be evaluated in more detail.
94	Gasco EE/CA	Indicator Chemicals (ICs)	2.5.1.2			General	Source Control	EPA would like to remind NW Natural of past discussions regarding total and free cyanide groundwater plumes. Both EPA and DEQ expressed concern via comments provided on the 2009 EE/CA Work Plan and May 2011 draft final HC&C Design Report regarding the high concentrations of cyanide detected in groundwater near the Willamette River. These data were obtained by both NW Natural and the U.S. Army Corps of Engineers (for the U.S. Moorings offshore area). The data indicate contaminated groundwater is likely migrating offsite to the north and discharging to the river via the U.S. Moorings site.  Further evaluation is needed regarding the potential migration of cyanide to the river and consideration of source control measures to address this issue.
95	Gasco EE/CA	Minimization of the Riverbank Infiltration Pathway	6.4.1	163		General	Source Control	Further discussion of the use of the impermeable geomembrane barrier to mitigate rainwater infiltration into the riverbank should be provided. Clarification should be provided on the goal of the geomembrane, the effectiveness of geomembrane at meeting the goal, and other technologies (e.g., removal) that could be utilized to achieve the same goal. Also, the cost and implementability factors associated with the use of this material should be described.

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96	Gasco EE/CA	Overall Protection of Human Health and the Environment	7.2.2.2	183		Specific	Source Control	The last paragraph states: "The upland groundwater extraction system will result in a reversed groundwater gradient in the alluvial sediments that will cause COCs in river sediments to move toward upland extraction system where groundwater is captured and treated over time." This is a working hypothesis that has not been proven. The area of reserved flow seems very large and the modeling results should be evaluated in more detail. This detailed evaluation should present the uncertainties associated with the groundwater model and the implications associated with this uncertainty given that the HC&C system has yet to be completed and tested.
97	Gasco EE/CA	Riverbank Remediation	7.2.2.3.3	188		Specific	Source Control	No active remedy is proposed for the riverbank soil but it seems that most of that soil has not been sampled because of the presence of riprap, which armors against erosion. It is unclear as to whether there is enough data to state that there is no product emanating from the riverbank.
98	Gasco EE/CA	Magnitude of Residual Risk – Minimization of Potential for Groundwater	7.2.4.1.3	193 - 194		Specific	Source Control	As stated in the "Source Control" comment regarding Section 7.2.2.2, it is unclear whether the HC&C system will be effective at minimizing groundwater impacts given the use of a preliminary model to define the effectiveness of the system and the fact that the HC&C system has yet to be completed and tested.
99	Gasco EE/CA	Detailed Analysis of Alternatives	??			General	Source Control	<p>DEQ's March 21, 2008 letter commenting on the DNAPL/Groundwater FFS (see reference below) informed NW Natural that planning, design, and implementation of uplands SCMs must take into consideration future riverbank work. Since that time DEQ has consistently maintained:</p> <ul style="list-style-type: none"> <li>• Future riverbank work should not interfere with installation and/or operation of uplands SCMs and/or DNAPL/groundwater treatment system equipment, buildings, or piping; and</li> <li>• Uplands SCMs should not limit NW Natural's ability to develop a complete and effective approach to addressing the riverbank.</li> </ul> <p>Draft EE/CA Alternatives 4 and 5 results in removal of uplands SCMs (i.e., Fill WBZ interceptor trench and Alluvium WBZ HC&amp;C system) due to slope layback assumptions and then use this outcome to argue for elimination of these alternatives. For clarification, DEQ does not consider damage and/or destruction of uplands SCMs to be justifications for removing otherwise valid remedial alternatives from consideration in the Draft EE/CA. DEQ's comment regarding the limitations of the 3:1 slope assumption and the need for the Draft EE/CA to evaluate temporary engineering measures applies here.</p> <p>(Reference: Anchor QEA, LLC, 2007, "Groundwater/DNAPL Source Control Focused Feasibility Study – NW Natural 'Gasco' Site," received October 12 [amended November 9, 2007], a report prepared for NW Natural.)</p>
100	Gasco EE/CA	Appendix F Appendix H				General	Source Control	DEQ considers the riverbank risk screening and hot spot screening evaluations described in the Draft EE/CA and documented in Appendix F and Appendix H to be preliminary. As indicated by NW Natural, the Draft EE/CA screened riverbank data available from the top of bank down to approximately 13 feet NAVD88. NW Natural is performing a human health and ecological risk assessment of the Gasco Site uplands (Gasco Uplands RA) that will integrate and analyze riverbank and uplands data consistent with the human health and ecological exposure areas identified for the uplands. The hot spot determination for the Gasco Site uplands will be conducted following completion of the Gasco Uplands RA. The findings and conclusions of the approved Gasco Uplands RA and hot spot determination should be fully incorporated into the Gasco Sediment Project during the Preliminary Design Development phase to ensure the Gasco Sediment Cleanup Action achieves uplands and in-water RGs.
101	Gasco EE/CA	Buried Contamination Analysis	4.6			Specific	Substantial Product	All areas of buried contamination should be identified, regardless of river current and sediment transport modeling. Appropriate risk management decisions can then be made about how they should be addressed. Additionally, all areas of buried contamination should be discussed in the detailed evaluation of alternatives in Chapter 7.
102	Gasco EE/CA	Substantial Product Observations Summary	2.5.3	28 - 29	Figure 2.5.3-1 and Tables 4.4.1-1 and 4.4.1-2	Specific	Substantial Product	The text begins the discussion of substantial product by differentiating between solid phase (pencil pitch and lampblack) and liquid phase (DNAPL) product. The solid phase material is further segregated between material above 13 feet NAVD88, which is considered upland and outside of the scope of the EE/CC, and material below that considered under the purview of the EE/CA. The data used to prepare Figure 2.3.3-1 is presented on Tables 4.4.1.-1 and 4.4.1-2, whose titles seem to be switched.
103	Gasco EE/CA	Potential Future Maintenance Dredge Areas Outside of Navigation Channel	4.6.1	96 - 97		Specific	Substantial Product	Contaminants (and substantial product) that exceed the RAL and are within the navigation channel, and within the depth of potential future maintenance dredging, should be removed to a depth that will not impact future dredging operations.

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104	Gasco EE/CA	Alternative 1: No Action Detailed Analysis	7.3.1	207		Specific	Substantial Product	EPA disagrees that the No Action alternative meets the Overall Protection criterion. Sediment trap data indicate that the area is an ongoing source of PAHs to downstream areas. The presence of NAPL is an unacceptable long-term risk. Flux of dissolved contaminants from both groundwater and sediment is contributing to exceedances of AWQC and risk to aquatic organisms. The groundwater extraction system is unlikely to control migration of PAHs into the river.
105	Gasco EE/CA	Alternative 2a Detailed Analysis	7.4.1	210		Specific	Substantial Product	EPA believes Alternative 2a is unlikely to meet the Overall Protection of Human Health and Environment criterion because the presence of NAPL is an unacceptable long-term risk and the groundwater extraction system is unlikely to control migration of groundwater and thus COCs into the river.
106	Gasco EE/CA	Substantial Product RAO	8.1.4	246		General	Substantial Product	The discussion of the substantial product RAO should focus more on the whether the costs are proportionate to the degree of risk reduction to be attained through physical removal rather than the discussion relative to downstream transport which could be managed through the water quality management controls such as sheet pile installation.
107	Gasco EE/CA					General	Substantial Product	Evaluation of "substantial product": As discussed in EE/CA Section 2.5.3 and many other places, RAO 1 of Section 3.2 of the SOW provides a preference for removal of sediments containing substantial amounts of product. According to EE/CA text on page 29, visual observations from core and borings logs were placed in two categories: 1) substantial product that was solid (e.g., tar) and considered non-mobile and 2) substantial product that was in liquid form (e.g., liquid oil, saturated media, DNAPL layers) and considered potentially mobile. (Note: no material was identified in category 3).  Except for Alternative 5, most of the alternatives do not substantially address the "substantial product" identified areas in Figure 2.5.3-1 with removal. Under most alternatives, many of the areas with substantial product are addressed by capping. This technology is evaluated as effective because groundwater modeling indicates that "upland source controls will prevent upland groundwater from discharging through river sediments..." As a result, the EE/CA does not appear to be consistent with the SOW. RAO 1 specified in the SOW states that: "Removal of sediments containing substantial amounts of product (e.g., solid "tar" and/or NAPL) that may serve as potential future source of risk material, unless it can be shown that the costs of such removal are clearly disproportionate to the degree of risk reduction to be attained through physical removal as compared to other remedial options for the same material."
108	Gasco EE/CA	Engineered Capping	5.4			Specific	Technology Evaluation - Capping	The evaluation of the effectiveness of the engineered cap is largely based on modeling and assumptions about groundwater flow direction and velocity. The groundwater model assumes that dissolved organic compounds moving upward through the cap will undergo biodegradation and partition onto the cap material. This assumption should be thoroughly evaluated with field testing before any remedy that relies on an engineered cap is implemented.
109	Gasco EE/CA	2005 Removal Action	2.2.4	15		Specific	Technology Evaluation - Capping	This paragraph states that a pilot cap was placed over the primary tar deposit removal area. NW Natural should provide a discussion of the effectiveness of this cap in preventing contaminant migration.
110	Gasco EE/CA	Appendix I	Appendix I 2.1.3.2			General	Technology Evaluation - Capping	Key capping model parameters include porewater concentrations and Darcy velocity. Although the porewater concentrations appear reasonable (e.g., naphthalene up to 11,200 ug/l), the Darcy velocities in the area of the cap are on the order of -49 cm/yr. Darcy velocities upstream of the cap are significantly higher at 167 cm/yr. The Darcy velocities in the cap area were estimated using a the results of the groundwater source control model. It is unclear whether a Darcy velocity of -49 cm/yr is reasonable. In addition, the modeling approach assumes both anaerobic (within the cap) and aerobic (at the surface of the cap) degradation rates. While degradation may occur to some degree, the rate of degradation in the natural environment is highly variable. As a result, the model should be run assuming no degradation as a conservative case. Overall though, if the source control measure will reverse the hydraulic gradient as assumed and if the reactive capping technologies are used in areas where porewater concentrations are predicted to exceed criteria, capping may be effective. However, the long term effectiveness of the capping option will need to consider the operation and maintenance of the hydraulic control system and expected life span of the reactive capping amendment (e.g., time until breakthrough).
111	Gasco EE/CA	Removal	5.6			Specific	Technology Evaluation - Dredging	EPA believes removal via both hydraulic and mechanical dredge should be considered, and the use of silt curtains should be maintained as a potential best management practice.
112	Gasco EE/CA	Removal	5.6.1	124		General	Technology Evaluation - Dredging	The use of a clean cover to address residuals will function as a cap. While the placement of clean material to isolate residuals is expected to be effective in the short term if placed immediately following the final dredge pass, evaluation of the long term effectiveness of the clean cover should be evaluated in light of the high groundwater flux at the Gasco site.

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113	Gasco EE/CA	Removal	5.6.2.1	125		General	Technology Evaluation - Dredging	Removal of contaminated sediments using barge mounted dredging equipment with long reach excavators equipped with narrow budgets may be effective at removing shallow sediments below and adjacent to dock structures at the Gasco site. This limited removal in conjunction with post removal cap placement may be an effective approach for addressing contamination in and around non-removable structures. To further enhance long term effectiveness, active capping materials such as reactive core mats may be incorporated into the cap design. NW Natural should consider the use of these methods.
114	Gasco EE/CA	Operational Controls	5.6.3.1	127		General	Technology Evaluation - Dredging	Based on information presented in the EE/CA, experience at other sites, and the presence of debris and structures at the Gasco site, removal activities are expected to generate significant residuals. While the placement of a sand cover once removal operations are complete is described, evaluation of the effectiveness of this sand cover at meeting the removal action objectives should be performed. In addition, based on the water quality monitoring during the 2005 removal action, significant releases are expected during dredging. The EE/CA should discuss the magnitude of these expected releases and describe potential control measures for controlling these releases.
115	Gasco EE/CA	Rigid Containment Barriers	5.6.3.2.2	129		General	Technology Evaluation - Dredging	The discussion of rigid containment should include discussion of the current dredging at the Diamond Alkalai site on the Passaic River. Due to the effectiveness of sheet pile enclosures water quality monitoring during the implementation of the dredging activity is no longer required. Methods to reduce releases at the Diamond Alkalai site include application of a sealant to the sheet pile joints to reduce the interlock permeability. Scour at base of the sheet pile can be mitigated by armoring methods, such as erosion control mattresses or graded rock layers, or use of sheet pile deflector walls .
116	Gasco EE/CA	Review Environmental Dredging Releases and Water Quality Impacts	5.6.3.3	132		General	Technology Evaluation - Dredging	This discussion lumps all barrier controls into one group and implies that silt curtains and rigid containment are equally ineffective (i.e., release rates observed are generally in the range of 2 to 4 percent). It seems unlikely that both barrier technologies would release the same amount of material. Further references and justification should be provided distinguishing between the effectiveness of each technology.
117	Gasco EE/CA	Surface Sediment RAOs	8.1.1	243		General	Technology Evaluation - Dredging	The EE/CA report states: Alternatives that include more dredging/removal (Alternatives 4 and 5) are projected to result in higher overall surface sediment concentrations (particularly for naphthalene) over substantial periods of time due to the duration of construction and the effects of dredge residuals as compared to those alternatives with more emphasis on in-place technologies and MNR. It should be noted that the use of sheet pile containment (with appropriate BMPs) may mitigate many of these effects by containing releases and perhaps allowing for work outside the dredge windows thus shortening the overall time for remediation. NW Natural should consider evaluating the use of sheet piles to mitigate these effects.
118	Gasco EE/CA	Summary of Comparative Evaluation Relative to RAOs	8.1.6	247		General	Technology Evaluation - Dredging	The EE/CA states that because the various alternatives achieve similar contaminant levels, the "comprehensive alternatives that include greater dredging/removal volumes and/or longer construction durations (especially Alternative 5 at 10 years' duration) provide less overall protection of human health and the environment than shorter duration alternatives that focus on in-place technologies." The evaluation of short-term impacts should be conducted as part of the short-term effectiveness. It should also be noted that alternatives that remove or effectively isolated a larger mass of contamination will score higher under long-term effectiveness and permanence.
119	Gasco EE/CA	Transition Zone Water Quality	2.5.6	34		General	TZW Evaluation	The discussion of TZW should include discussions regarding the magnitude of toxicity reference values (TRVs) used to evaluate risks to aquatic life in the baseline ecological risk assessment (BERA) for the Portland Harbor site. The chemicals with the highest hazard quotients should be highlighted.
120	Gasco EE/CA	Interim Area Identification	4	4 and 70		General	U.S. Moorings	EE/CA Interim Project Area Identification: As stated on page 4 and Section 4 (page 70), the EE/CA presents an "interim Project Area representing a further refinement of the lateral and vertical extent of SMA 9U remedial action areas". The 2009 Gasco Sediment Site Area of Interest includes the U.S. Moorings property; it is noted that SMA 9U and the EE/CA interim Project Area do not include the U.S. Moorings property. The EE/CA interim Project Area includes the riverbank ("below the top of the bank as defined in the SOW"). Figure 2.5.3-1 show the extent of substantial product, Figure 4.4.2-1 show the comprehensive Benthic Risk Assessment Boundary, and Figure 4.4.3-1 shows the RAL contours for BaPEq. These three evaluations combine to form the interim Project Area shown in Figure 4.4.6-1. EPA will be evaluating data to determine if portions of the U.S. Moorings area belong within the interim Project Area.
121	Gasco EE/CA	Results - Interim Project Area Identification	4.4			General	U.S. Moorings	The U.S. Moorings RI Report describes sediment samples collected off-shore of the U.S. Moorings site as follows: "At depths between 20 – 40 inches the sediments are soft, brownish olive-gray, moist silty/clays (30/70) with evidence of both thin (<1"), gray sand stringers, and black bands of PAH enriched sediments, some with mineralized PAH layers." And "all the under-dock cores (except SDUD-4), Dredge Areas A and C, and at SDDB-20 the subsurface sediments contained black laminar bands of PAH enriched sediment with diffuse sheen and strong PAH odor." BaP was detected in the U.S. Moorings dock area at concentrations up to 39 mg/kg. EPA will be evaluating data to determine if portions of the U.S. Moorings area belong within the interim Project Area.

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122	Gasco EE/CA	Development of Remedial Alternative Footprints	6.1	146-150		General	U.S. Moorings	All alternatives need to consider the removal of substantial product consistent with the SOW. In addition, the interim boundary needs to encompass all areas with substantial product consistent with the SOW. An EPA independent review of boring logs provided by the U.S. Army Corps of Engineers determined that substantial product, as defined in the SOW, is present within and downriver of the U.S. Moorings dock. EPA will be providing NW Natural a technical memorandum supporting this finding. At a minimum, this area should be included within the interim Project Area boundary based on the substantial product line of evidence and potentially a larger area may need to be included based on the other lines of evidence specified in the SOW for defining the Project Area boundary.
123	Gasco EE/CA	Development of Remedial Alternative Footprints	6.1			Specific	U.S. Moorings	The removal action boundary should be expanded to include areas of elevated BaPEq located downstream in the vicinity of the dock areas at the U.S. Moorings site. BaP concentrations are present at levels up to 39 mg/kg. EPA will be evaluating data to determine if portions of the U.S. Moorings area belong within the interim Project Area.
124	Gasco EE/CA	Vessel Traffic Patterns	2.2.3	15		Specific	U.S. Moorings	The EE/CA states that "sediment remediation is not expected to affect navigation to the U.S. Moorings Dock just downstream of the Gasco Sediments Site." Given the presence of elevated levels of benzo(a)pyrene and evidence of free product offshore of the U.S. Moorings facility, additional discussion of the U.S. Moorings Dock and berthing operations is required in this section.
125	Gasco EE/CA	Substantial Product Observations Summary	2.5.3	29	Figure 2.5.3-1	Specific	U.S. Moorings	The 1994 Preliminary Assessment completed by the U.S. Army Corps of Engineers for the U.S. Moorings facility included a series of sediment borings that showed evidence of product. In addition, the recent RI report completed by the U.S. Army Corps of Engineers also identified the presence of tar offshore of the U.S. Moorings facility. This information should be used to update the free product distribution figure (Figure 2.5.3-1) and should be incorporated into the revised interim action area.
126	Gasco EE/CA	Substantial Presence of Product	4.1.1	72		General	U.S. Moorings	The evaluation to determine the extent of "substantial product" should be expanded to include sediment cores collected off shore of the U.S. Moorings facility. EPA will be evaluating data, including U.S. Mooring boring logs, to determine if portions of the U.S. Moorings area belong within the interim Project Area.
127	Gasco EE/CA	SOW Risk Management Framework	9.1.2	271		Specific	U.S. Moorings	The project boundary discussed under Item 1 should incorporate the recent U.S. Moorings sediment data which shows BaPEq concentrations of up to 36 mg/kg in surface sediments outside the removal action boundary. EPA will be evaluating data to determine if portions of the U.S. Moorings area belong within the interim Project Area.